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October 26, 1993

Dr. Thomas Kinder
ONR Code 321CS
Ballston Towers One
800 North Quincy Street
Arlington, VA 22217-5660

Dear Tom:

Enclosed is the final report for ONR contract N00014-90-J-1808, "Comparison of Satellite-Derived Velocity Fields in the Coastal Transition Zone," along with another copy of the paper. Hopefully, my future final reports will be more timely.

Regards,

Kathie

Kathryn A. Kelly

KAK/dt

enc.

cc: Admin. Grants Officer
Director, Naval Research Lab.
Defense Technical Info. Ctr. ✓
E. Botelho, WHOI Sponsored Prog.

Comparison of Satellite-Derived Velocity Fields in the Coastal Transition Zone

Final Report

Kathryn A. Kelly

This ONR-sponsored research resulted in a paper, which was published in the June, 1992 issue of *Journal of Geophysical Research – Oceans*, entitled "Comparison of Velocity Estimates from Advanced Very High Resolution Radiometer in the Coastal Transition Zone," by myself and P. Ted Strub. The following description is reproduced from the abstract:

Two methods of estimating surface velocity vectors from advanced very high resolution radiometer (AVHRR) data were applied to the same set of images and the results were compared with in situ and altimeter measurements. The first method used an automated feature-tracking algorithm and the second method used an inversion of the heat equation. The 11 images were from 3 days in July 1988 during the Coastal Transition field program and the in situ data included acoustic Doppler current profiler (ADCP) vectors and velocities from near-surface drifters. The two methods were comparable in their degree of agreement with the in situ data, yielding velocity magnitudes that were 30–50% less than drifter and ADCP velocities measured at 15–20 m depth, with rms directional differences of about 60°. These differences compared favorably with a baseline difference estimate between ADCP vectors interpolated to drifter locations within a well-sampled region. High correlations between the AVHRR estimates and the coincident Geosat geostrophic velocity profiles suggested that the AVHRR methods adequately resolved the important flow features. The flow field was determined to consist primarily of a meandering southward flowing current, interacting with several eddies, including a strong anticyclonic eddy to the north of the jet. Incorporation of sparse altimeter data into the AVHRR estimates gave a modest improvement in comparisons with in situ data.

Subsequent contacts with other government agencies included providing the computer code and instructions to the Search and Rescue Division of the

Coast Guard in Groton, Connecticut; a joint seminar for the Coast Guard and the University of Connecticut on velocity estimation; and a current request for the computer code from the Naval Research Laboratory at Stennis Space Center.